



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/919,290	07/31/2001	Tianli Zhu	C-2501	2495

7590 02/02/2004  
Stephen A. Schneeberger  
49 Arlington Road  
West Hartford, CT 06107

EXAMINER
----------

MCHENRY, KEVIN L

ART UNIT	PAPER NUMBER
----------	--------------

1725

DATE MAILED: 02/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/919,290	<b>Applicant(s)</b> ZHU ET AL.	
	<b>Examiner</b> Kevin L McHenry	<b>Art Unit</b> 1725	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.  
     4a) Of the above claim(s) 1-9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-14 is/are rejected.
- 7) ☒ Claim(s) 14 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \*    c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
     \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
     a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

### DETAILED ACTION

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-9, drawn to a shift reactor, classified in class 422, subclass 211.

II. Claims 10-14, drawn to a method of reducing carbon monoxide in process fuel gas, classified in class 48, subclass 198.3.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus can be used to practice another process with different gases or to practice calcinating.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Bob Kelly on 13 January 2004 a provisional election was made without traverse to prosecute the invention of Group II, claims 10-14. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-9 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one

Art Unit: 1725

or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Information Disclosure Statement***

6. The information disclosure statement filed 31 July 2002 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered. No copies of the four non-patent literature documents were received.

### ***Claim Objections***

7. Claim 14 is objected to because of the following informalities:

Claim 14 needs a period at its end.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 1725

9. Claims 10 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 2000-203804.

JP 2000-203804 teaches a method of reducing the amount of carbon monoxide in a process fuel gas by feeding process fuel gas to a catalyst bed in a water gas shift reactor. The catalyst bed and process fuel gas react to convert at least a portion of carbon monoxide in the fuel gas via the water gas shift reaction. JP 2000-203804 teaches that air is mixed with the process fuel gas before the fuel is supplied to the shift reactor so that carbon monoxide will be oxidized and converted to carbon dioxide. JP 2000-203804 also teaches that the quantity of air in the hydrogen-rich gas is controlled by blowers and a control means (see JP 2000-203804; particularly abstract). The examiner notes that JP 2000-203804 has a U.S. Patent equivalent; Aoyama et al. (U.S.P. 6,455,008 – see column 2, lines 42-54; column 4, lines 50-62; column 5, lines 56-60; column 6, lines 17-52; column 7, lines 11-29).

### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-203804 as applied to claims 10 and 14 above, and further in view of Ernest et al. (U.S.P. 4,170,573) or Krumpelt et al. (U.S.P. 5,929,286).

Art Unit: 1725

JP 2000-203804 teaches the process described above in section 9. However, JP 2000-203804 does not teach the use of a catalyst bed composed of a noble or non-noble metal and a promoted support. Nor does JP 2000-203804 teach that the quantity of oxygen added to the process fuel gas is 2.0 mol% or less.

Ernest et al. teach a catalyst composition composed of ceria, lanthana, and alumina composite with a platinum group metal. Ernest et al. teach that this catalyst is capable of operating in the combustion of carbonaceous fuel at temperatures greater than 2400 °F for extended periods of time with low emissions of carbon monoxide and nitrogen oxides (see U.S.P. 4,170,573; particularly abstract; column 1, lines 5-11; column 2, lines 9-13).

Krumpelt et al. teach a method producing hydrogen-rich gas in which a catalyst composed of platinum and ceria is used. Other metals such as the noble metals and transition metals can be used instead of platinum. Other oxide ion conductors such as zirconia are applicable. Krumpelt et al. teach that this catalyst allows operation at lower temperatures, smaller reactors, and higher concentrations of hydrogen with less carbon monoxide (see U.S.P. 5,929,286; particularly column 1, lines 31-40, 58-67; column 2, lines 1-2).

It would have been obvious to one of ordinary skill in the art at the time that the applicant's invention was made to have modified the process of JP 2000-203804 by the teachings of Ernest et al. or Krumpelt et al. One would have been motivated to do so to allow operation of the catalyst in the combustion of carbonaceous fuel at temperatures greater than 2400 °F for extended periods of time with low emissions of carbon monoxide and nitrogen oxides, as taught by Ernest et al., or to allow operation at lower

Art Unit: 1725

temperatures, smaller reactors, and higher concentrations of hydrogen with less carbon monoxide, as taught by Krumpelt et al.

As noted above in section 9, JP 2000-203804 teaches that the quantity of air added to the process fuel gas is controlled, particularly to control the ratio of air to the hydrogen-rich gas. The claimed quantities of oxygen added to the fuel gas in claims 11 and 12 are not considered to confer patentability to the claims. Because the reactor's cost of operation and its efficiency of operation are variables that can be modified, among others, by adjusting the oxygen quantity to affect operating cost, operating temperature, carbon monoxide content, and operating efficiencies so that they are increased or decreased to optimal levels. The precise oxygen quantity would have been considered a result effective variable by one having ordinary skill in the art at the time that the invention was made. As such, without showing unexpected results, the claimed oxygen content cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the oxygen content in the process of JP 2000-203804 to obtain the desired balance between operating cost and operating efficiency.

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Aoyama et al. (U.S.P. 6,455,008), Reynolds (U.S.P. 3,919,114), Whitney (U.S.P. 6,476,084), Ahmed et al. (U.S. 2002/0172630), Ahmed et al. (U.S. 2002/0174603), and Silver (U.S.P. 6,455,182).

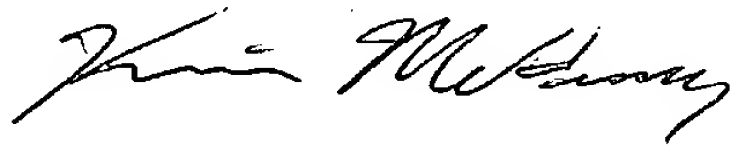


Art Unit: 1725

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin L McHenry whose telephone number is (571) 272-1181. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas G Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1234.



Kevin McHenry

Kiley Stoner A.U. 1725  
Kiley Stoner 11/21/04